CHLORIDE VARIANCE INFORMATION AND WORKSHEET

The Department has established rule changes to chs. NR 105, 106 and 211, Wis. Adm. Code, to regulate the discharge of chloride to surface waters of the state. Chapter NR 105 has been amended to include an acute toxicity criterion of 757 mg/l, and a chronic toxicity criterion of 395 mg/l. Chapter NR 106, subchapter IV, contains the procedure for regulating the discharge of chloride to surface waters of the state through the WPDES program.

Section NR 106.83(2) (a) states that, at present, end-of-pipe treatment for reduction of chlorides is often prohibitively expensive, and the concentrated brine that results from such treatment is often as much or more of a liability than the untreated effluent. Section NR 106.83(2)(a) also acknowledges that appropriate chloride source reduction activities are often preferable to treatment. Because of these findings, s. NR 106.83(2) establishes a variance process that may be employed for those facilities that discharge chloride-containing wastewater. To obtain the variance, the permittee must demonstrate that attaining the water quality standards may cause substantial and widespread adverse social and economic impacts in the area where the discharger is located.

A variance will be granted if the Department concurs that:

- the cost of end-of-pipe treatment would cause an adverse social and economic impact,
- the permittee cannot consistently meet a proposed water quality-based effluent limit for chloride (as defined in s. NR 106.88) without additional action (treatment or source reduction), and
- the permittee and the Department agree on an appropriate compliance schedule addressing source reduction measures, interim limits, and target limits or target values, as specified in the WPDES permit.

The Department will determine whether the permittee is subject to a proposed water quality-based effluent limit by calculating the upper-99^{th} percentile (P_{99}) of 1- and 4-day average discharge concentrations, using a minimum of 11 representative effluent values. If a 1-day P_{99} is greater than the daily limit (based on the acute criterion for chloride), the permittee is subject to a daily limit. If a 4-day P_{99} is greater than the weekly limit (based on the chronic criterion for chloride), the permittee is subject to a weekly limit.

However, s. NR 106.82(2) defines "consistently meeting" the chloride limit as 95% of the representative effluent data being less than the proposed limit. Section NR 106.88(1) specifies that if a permittee can consistently meet a water quality-based limit, the Department may include the water quality-based limit(s) and a compliance schedule in the permit. In such a case, a variance is not granted.

A worksheet for a chloride variance is attached. For those permittees seeking a chloride variance, the worksheet should be submitted to the Department, along with a cover letter requesting the chloride variance or as part of the permit reissuance application. For the questions relating to

capital and operation and maintenance (O&M) costs, the permittee may use the general estimates provided below if cost estimates specific to its facility are not available. These costs assume the installation and operation of a reverse osmosis (RO) unit for removal of chloride.

Capital Costs: An estimated capital cost [1]of $1.125 per gallon per day of design flow for the facility may be used. [Example: If the design flow of the facility is 2.3 MGD, then the estimated capital cost is $1.125 X 2.3 X 1,000,000 = $2,587,500.] Some individual factors can reduce the capital costs; for example, if a limit can be met by treating a portion of the waste stream and blending with untreated effluent. Capital costs can be increased if additional conventional treatment is needed for proper operation of the RO system.

O & M Costs: An estimated annual O & M cost is $1/1000 gallons/day x 365. [Example: If the design flow of the facility is 2.3 MGD, then the annual O & M cost is $1 X 2.3 X 1000 X 365 = $839,500/year.] The estimated O & M costs can also vary greatly. Costs may be less if a limit can be met by removing chloride from a portion of the waste stream and blending with effluent that has not undergone chloride treatment. The O & M costs do not include cost of disposal of the concentrated brine that is produced by operating an RO unit. Unlike most side streams in wastewater treatment systems, the concentrated brine cannot be treated by recycle through the wastewater process.

[1] Note: Capital costs can vary greatly and these estimated costs should not be used for planning purposes.

CHLORIDE VARIANCE WORKSHEET

At the time of permit application, permittees applying for a chloride variance should submit this completed worksheet together with a cover letter requesting the variance.

1) **Capital cost:**
   a) Have you done a study to determine the capital cost of end-of-pipe chloride removal for your facility? __Yes __No
      i) If **yes**, please include this information as part of the variance request.
      ii) If **no**, go to Step 1b.
   b) Estimate of relative capital cost: (see information sheet attached)
      i) Chloride removal capital cost: $1.125 x Annual Average Design Flow (in MGD) X 1,000,000 =_____
      ii) Percentage of capital cost of chloride removal to capital cost of wastewater facility = (Chloride Removal Capital cost (results of 1.b.i.) /Capital cost of current wastewater facility) x 100 = _____

2) **Operational (O & M) Cost based on the cost estimate:**
   a) Have you done a study to determine the annual O & M cost of end-of-pipe chloride removal for your facility? If so, please include this information as part of the variance request. If not, go to Step 2b.
   b) Estimate of relative O & M cost:
      i) Chloride removal O & M cost: ($1.00 x Annual Average Design Flow (in MGD) x 1000 x 365) = _____
      ii) Percentage of O & M cost of chloride removal to existing annual O & M cost of wastewater facility = (Chloride Removal O & M costs (results of 2.b.i)/O& M costs of current wastewater facility) x 100 = _____

3) **Do you know of a facility that could accept for treatment the concentrated brine solution that would result from end-of-pipe chloride treatment?**

   __Yes __No If **yes**, name of facility: _____

The information from questions 4 through 6 is requested to assist the permittee and the Department in determining appropriate effluent values or limitations, compliance schedules and source reduction measures.

4) **Have you sampled at least eleven effluent samples for chloride over the course of at least a year? _____**

5) **For Municipalities:**
   a) Have you identified industrial contributors of chloride to your sewer system? _____
   b) Have you requested voluntary reductions of chloride from any industrial users to your sewer system? _____
   c) Have you instituted sewer use ordinances regulating or limiting the discharge of chloride from significant industrial users? _____
   d) Does your community have centralized softening of source water through a water utility? _____

e) Have you determined typical concentrations of chloride from domestic users of your sewer system? _____
f) Does your community implement a public information program on proper maintenance and improved efficiency of residential softeners? _____
g) Have you implemented local ordinances to mandate the use of efficient softeners? _____

6) For Industries:

a) Is privately softened water, use of brine, or use of salt integral to your production process? _____
b) Do you operate a private softener for your industrial process? _____
c) Have you optimized operation of your water softener (adjustment of regeneration interval, salt dosage, replacement of backwash controller)? _____
d) Have you determined which industrial processes can be run without softened water? _____
e) Have you implemented practices to reduce or reuse any brine solutions or softened water in your industrial process? _____
f) Have you implemented housekeeping practices to reduce spillage of any brine solutions, or to minimize the contribution of salt to the wastewater treatment system? _____

Additional comments:

_____
_____
_____
_____

Based on the information provided above, and any additional information I have submitted, I believe that attainment of the applicable water quality standards for chloride may cause substantial and widespread adverse social and economic impacts in the area where this discharge is located, and am requesting a variance to the chloride standard. I understand that, as a condition of the variance, the Department and the permittee will need to agree upon an interim effluent limitation, a target value or target limitation, and a compliance schedule to implement source reduction, and that these conditions will be included in the permittee's WPDES permit.

_____ _____

Signature of Authorized Representative **Date**